

WHAT IS CLAIMED IS:

1. A method of forming an electrically conductive structure on a substrate, the method comprising the steps of:
 - (a) forming an electrically conductive electrode layer on the substrate, and
 - (b) forming an electrically conductive conduction layer over the electrode layer by;
 - (i) placing the substrate in a plating solution,
 - (ii) applying a first current to the substrate at a first bias and a first density for a first duration,
 - (iii) applying a second current to the substrate at a second bias and a second density for a second duration, and
 - (iv) cyclically applying the first current and the second current at a frequency of between about thirty hertz and about one hundred and thirty hertz.
2. The method of claim 1 wherein the density of the second current is between about two times and about four times the density of the first current.
3. The method of claim 1 wherein the first bias is a forward bias.
4. The method of claim 1 wherein the second bias is a reverse bias.
5. The method of claim 1 wherein the first duration is between about four and about twenty milliseconds.
6. The method of claim 1 wherein the second duration is between about one and about four milliseconds.
7. The method of claim 1 further comprising the step of forming an etched feature in the substrate prior to the step of forming the electrode layer.
8. The method of claim 1 wherein the first duration corresponds to a depletion time of the plating solution.

9. The method of claim 1 wherein the second duration corresponds to a replenishment time of the plating solution and an etch time of corners of trenches in the substrate.
10. The method of claim 1 further comprising immediately applying the second current after the application of the first current without a dead time between the application of the first current and the application of the second current.
11. The method of claim 1 further comprising a dead time between the application of the second current and the succeeding application of the first current, where no current is applied to the substrate.
12. An integrated circuit, the improvement comprising the electrically conductive structure formed according to the method of claim 1.
13. A method of forming an electrically conductive structure on a substrate, the method comprising the steps of:
- (a) forming an etched feature in the substrate,
 - (b) forming an electrically conductive electrode layer on the substrate, and
 - (c) forming an electrically conductive conduction layer over the electrode layer by;
 - (i) placing the substrate in a plating solution,
 - (ii) applying a first current to the substrate at a forward bias and a first density for a first duration, where the first duration corresponds to a depletion time of the plating solution in the etched feature,
 - (iii) applying a second current to the substrate at a reverse bias and a second density for a second duration, where the second duration corresponds to a replenishment time of the plating solution in the etched feature
 - (iv) applying a dead time where no current is applied to the substrate, and

- (v) cyclically applying steps (ii) through (v) at a frequency of between about thirty hertz and about one hundred and thirty hertz.

14. The method of claim 13 wherein the density of the second current is between about two times and about four times the density of the first current.

15. The method of claim 13 wherein the first duration is between about four and about twenty milliseconds.

16. The method of claim 13 wherein the second duration is between about one and about four milliseconds.

17. An integrated circuit, the improvement comprising the electrically conductive structure formed according to the method of claim 13.

18. A method of forming an electrically conductive structure on a substrate, the method comprising the steps of:

- (a) forming an electrically conductive electrode layer on the substrate, and
- (b) forming an electrically conductive conduction layer over the electrode layer by;

- (i) placing the substrate in a plating solution,

- (ii) applying a direct current patch deposition at a forward bias,

- (iii) applying a first current to the substrate at a first bias and a first density for a first duration,

- (iv) applying a second current to the substrate at a second bias and a second density for a second duration,

- (v) cyclically applying the first current and the second current at a frequency of between about thirty hertz and about one hundred and thirty hertz, and

- (vi) applying a direct current bulk deposition at a forward bias.

19. The method of claim 18 wherein the density of the second current is between about two times and about four times the density of the first current.

20. The method of claim 18 wherein the first duration is between about four and about twenty milliseconds and the second duration is between about one and about four milliseconds.

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